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# Map Indexing System User's Manual

Federation of Rocky Mountain States, Inc, Fort Collins, CO

Prepared for

Fish and Wildlife Service, Fort Collins, CO Western Energy and Land Use Team

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The manual describes the map indexing system (MIS) component of the U.S. Fish and Wildlife Service's Geographic Information System. It explains how spatially related data which is used and needed by the Fish and Wildlife Service can be catalogued and filed in a comprehensible, partially manual, partially automated, library system. The manual contains a general overview of MIS components, directions on using the MIS to evaluate data bases, and suggestions on where to search if data is not in the system. An appendix provides examples of system commands.

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# MAP INDEXING SYSTEM
# USERS MANUAL

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TABLE OF CONTENTS

1.0 INTRODUCTION . . . . . 1
1.1 Goal of Project . . . . . 1
1.2 Why MIS Was Developed . . . . . 1

2.0 GENERAL OVERVIEW OF MIS COMPONENTS . . . . . 2
2.1 Description of data information flow through MIS components . . 2
2.2 Document and Map Collections. . . . . 2
2.3 Information Indexing System . . . . . 2
2.4 User Information Guides . . . . . 4
2.4.1 Index Card File. . . . . 4
2.4.2 Data Log Book. . . . . .10
2.4.3 MIS Computer Reports . . . . . .13

3.0 USING MIS TO EVALUATE DATA BASES . . . . . .15

4.0 WHERE TO SEARCH IF DATA IS NOT IN MIS. . . . . .17

5.0 SUMMARY. . . . . .17

APPENDIX A EXAMPLES OF COMMANDS FOR DATA BASE SEARCHING WITH A COMPUTER TERMINAL . . . . . .20

## LIST OF FIGURES

Figure 2.1 GIS manual/automated data indexing system . . . . . 3

Figure 2.2 Example of a card from the MIS index card file. . . . . 5

Figure 2.3 Indexing Data by State and 1:250,000 USGS Quadrangles . . . . 8

Figure 2.4 Page from data log book . . . . . .11

Figure 2.5 Page from data log book . . . . . .12

Figure 2.6 Computer Search for Topographic Data in Hardin USGS 1:250,000 Quad Area, Montana . . . . . .14

Figure 3.1 Using MIS for data base evaluation. . . . . .16

## LIST OF TABLES

Table 2.1 Area Entries and Their Code Numbers (taken from American Geographic Society System) . . . . . 6-7

Table 2.2 Main Subject Divisions and Abbreviations . . . . . 9

Table 4.1 Data Available for Montana . . . . . .18

Table 4.2 Data Available for Wyoming . . . . . .19

# 1.0 INTRODUCTION

## 1.1 Goal of Project

This project is defined and sponsored by the Western Energy and Land Use Team (WELUT) to promote more effective consideration of fish and wildlife resources in the numerous state and federal decisions concerning western land, energy, mineral and water resources.

The goal of this two year project is to develop an operational capability within the U.S. Fish and Wildlife Service (FWS) to accept, store, manipulate, and output spatially related data for use in a variety of FWS programs. This includes not only the data that has been and will continue to be collected by the FWS, but also includes data available in computerized and non-computerized data files of other federal and state natural resource management agencies. This goal is to be achieved with minimal development of new computer software and minimal hardware requirements. The project will start on a prototype basis within selected test case areas and will broaden to other applications.

The primary operational level users of this system in its developmental stages are in the Billings Area Office (BAO) of the U.S. Fish and Wildlife Service. The biologists in this office are faced with the weekly task of assessing the wildlife resource impacts of various land use changes. This project will attemp to develop simple, usable, practical tools for operational use at the regional and area office level.

## 1.2 Why MIS Was Developed

Parallel to the development of a geographic information system (GIS) is the collecting and documentation of data bases that will be used by the GIS. A plan for a data library system should therefore be proposed during the initial development stages of any GIS. The Federation of Rocky Mountain States (FRMS) is responsible for developing a Geographic Information System for the FWS. As a result, a system has been developed for indexing and storing large volumes of spatially related data. It is the purpose of this document to explain how spatially related data which is used and needed by the FWS can be catalogued and filed in a comprehensible, partially manual, partially automated, library system.

This document describes the map indexing system (MIS) component of the Fish and Wildlife Service Geographic Information System. Data bases entered into MIS include automated and non-automated data relating to physical, biological, social or economic factors which are of potential value to the U.S. Fish and Wildlife Service.

## 2.0 GENERAL OVERVIEW OF MIS COMPONENTS

### 2.1 Description of data information flow through MIS components

Figure 2.1 presents a flowchart description of the components of MIS, which together form a comprehensive information identification and retrieval system. The three components, as illustrated are:

1) Document and Map Collections
2) Information Indexing System
3) User Information Guides

### 2.2 Document and Map Collections

As indicated in Figure 2.1, the GIS document and map collection will consist of the following two parts: 1) the actual FWS collection of maps and documents which are being acquired, stored and maintained in various FWS offices (BAO, WELUT, Region 6), and 2) document and map collections which are not actually maintained in FWS offices but remain in other Federal or State Resource offices. The latter case is data which are used infrequently by FWS, thereby making it more economical to simply keep an index to the availability, location, and characteristics of the data from outside sources, rather than keeping a voluminous, complete in-house collection.

Both the document and map collections will be available in various formats. The three basic formats of data include:

1. Written records (field notes, completed questionnaires and forms, published documents with text and tables, and manual card files).

2. Graphic records (ranging from uninterpreted aerial photographs to printed maps).

3. Machine readable records (the format most easily used by the GIS as this is the format that all data must ultimately be converted to before used by the GIS).

The FWS-GIS library system as described in the following sections will account for the three types of information formats in both FWS files and files of outside sources.

### 2.3 Information Indexing System

Figure 2.1 illustrates how spatial data will be indexed within the system. As data is located, and/or acquired by the FWS, the characteristics of the data is funneled through an indexing procedure. A computer bibliographic storage and retrieval system will be used to automate the indexing procedure.

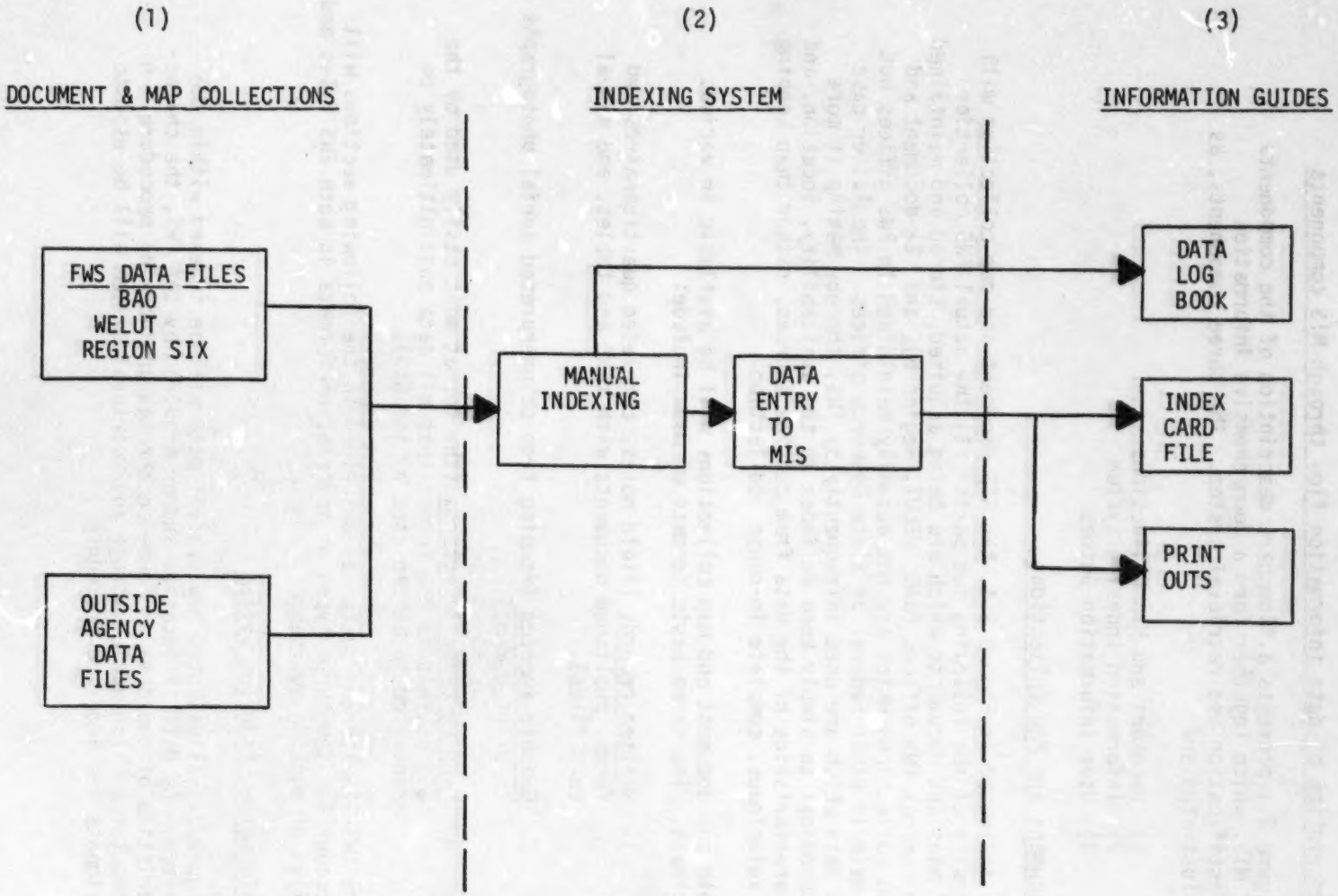



Figure 2.1 GIS manual/automated data indexing system

## 2.4 User Information Guides

Probably the most important of the three components within the library system to the user are the user information guides (see Figure 2.1). User information guides can be used to help a data searcher locate data bases for his particular purpose. The three basic types of user information guides include the following:

1. Index card file
2. Data log book
3. Computer printouts

### 2.4.1 Index Card File

The index card file functions exactly like a traditional library card file. Figure 2.2 is an example of a typical subject index card for an Energy Resources map of Wyoming. The types of information recorded on the card include:

1. Call number, date
2. Subject
3. Area of coverage (state, county, 7½ min quad, etc.)
4. Title, scale
5. Log book page
6. Source of data
7. Physical location of data

The call number on the card (see Figure 2.2) is a unique number that is assigned each new data entry, therefore, each map, document or any other data medium will have a call number that is different than any other entry. It is this call number that determines the location of data in map files, document collections and computer machine readable records.

The first number on each card is a description of the data's area of coverage. The numbering system proposed for use by FWS was developed and used by the American Geographic Society for indexing their maps, and documents containing maps. Based on their system, each state is assigned a unique number (see Table 2.1).

To help delineate the area of coverage even further, each state is also divided into its respective 1:250,000 USGS topographic areas. Each 1:250,000 topographic area is assigned a number as illustrated in Figure 2.3. This gives the user an additional degree of spatial resolution when tracing down data pertinent to a specific locality. As illustrated in Figure 2.3, the data on this particular card falls in Wyoming (894) and the Gillette 1:250,000 quad area (.04), resulting in number 894.04 for this particular data item entered in MIS.

The second number on the card illustrated in Figure 2.3 (S-1975) refers to the subject (soils) and the year the data was generated (1975). The subjects used at this time in MIS and their corresponding abbreviations to be used as part of the call number are given in Table 2.2.

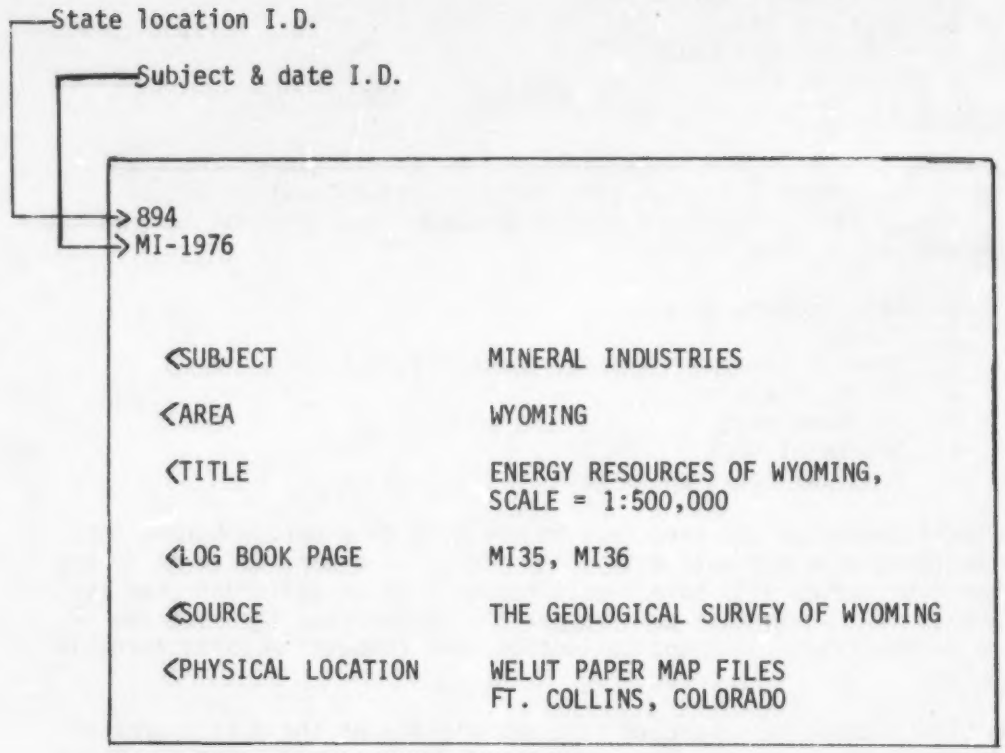



Figure 2.2 Example of a card from the MIS index card file

Table 2.1

Area Entries and Their Code Numbers
(Taken from American Geographic Society System)

| | | | |
|---|---|---|---|
| 000 | Universe | 825 | Idaho |
| 050 | World | 830 | Illinois |
| 052 | The Western Hemisphere | 831 | Indiana |
| 100 | North America | 832 | Iowa |
| 800 | United States | 835 | Louisiana |
| 801 | Eastern U.S. | 840 | Maine |
| 802 | Western U.S. | 841 | Maryland |
| 803 | Southern U.S. | 842 | Massachusetts |
| 804 | Northern U.S. | 843 | Michigan |
| 805 | Northeast U.S. | 844 | Minnesota |
| 806 | Southeast U.S. | 845 | Mississippi |
| 807 | Southwest U.S. | 850 | Missouri |
| 808 | Northwest U.S. | 851 | Montana |
| 809 | Alabama | 852 | Nebraska |
| 810 | Alaska | 853 | Nevada |
| 811 | Arizona | 854 | New England |
| 812 | Arkansas | 855 | New Hampshire |
| 813 | California | 860 | New Jersey |
| 814 | Colorado | 861 | New Mexico |
| 820 | Connecticut | 862 | New York |
| 821 | Delaware | 863 | North Carolina |
| 822 | Washington, D.C. | 864 | North Dakota |
| 823 | Florida | 870 | Ohio |
| 824 | Georgia | 871 | Oklahoma |

Table 2.1 continued

| | | | |
|---|---|---|---|
| 872 | Oregon | 883 | Utah |
| 873 | Pennsylvania | 884 | Vermont |
| 874 | Rhode Island | 890 | Virginia |
| 875 | South Carolina | 891 | Washington |
| 880 | South Dakota | 892 | West Virginia |
| 881 | Tennessee | 893 | Wisconsin |
| 882 | Texas | 894 | Wyoming |

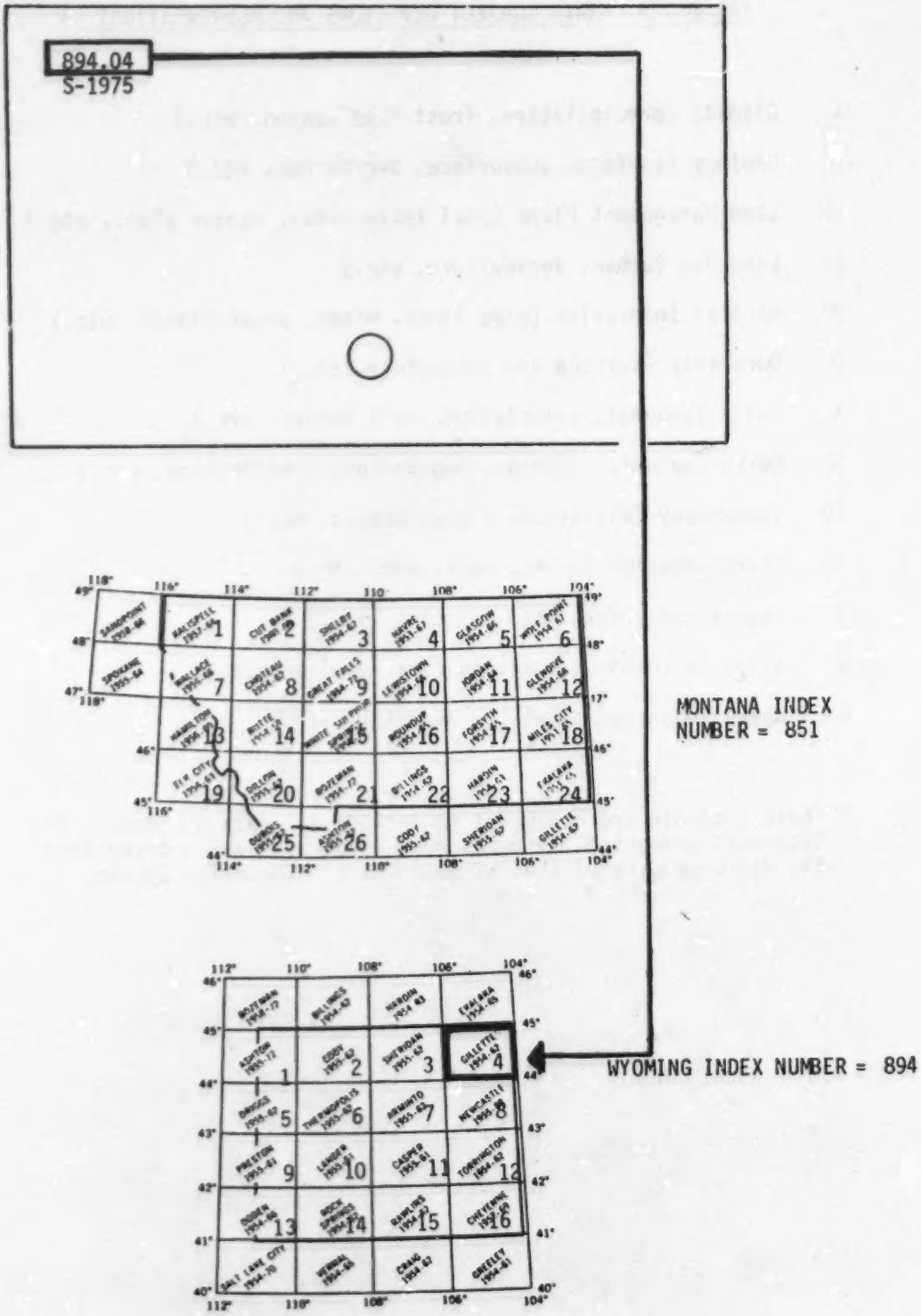



Figure 2.3 Indexing Data by State and 1:250,000 USGS Quadrangles

TABLE 2.2 *MAIN SUBJECT DIVISIONS AND ABBREVIATIONS

| | |
|---|---|
| C | Climate (precipitation, frost-free season, etc.) |
| G | Geology (surface, subsurface, overburden, etc.) |
| LM | Land Management Plans (coal lease areas, master plans, etc.) |
| LU | Land Use (urban, agriculture, etc.) |
| MI | Mineral Industries (pipe lines, mines, power plants, etc.) |
| O | Ownership (surface and subsurface, etc.) |
| S | Soils (general, association, soil series, etc.) |
| SE | Socio-Economic (census, population, distribution, etc.) |
| TO | Topography (elevation, slope, aspect, etc.) |
| TR | Transportation (roads, rail, air, etc.) |
| V | Vegetation (potential, existing, etc.) |
| W | Wildlife (habitat, distribution, siting, etc.) |
| WR | Water Resources (quality, quantity, etc.) |

* These subjects are not meant to include all data subjects. The list will undoubtedly grow as more data bases are entered into the MIS component of the FWS Geographic Information System.

### 2.4.2 Data Log Book

The second user information guide is a data log book. The data log book is a book which contains a detailed description of information that is recoreded on the file cards. Figures 2.4 and 2.5 are two pages of the log book. These forms were originally designed by FRMS to assess what data bases and the characteristics of data bases were available from different federal, state or private organizations. The first page is filled out for any data that is spatially-referenced. The second page is filled out for any spatially-referenced data that is in some computer-readable format.

Figure 2.4 Page from data log book

Federation of Rocky Mountain States, Inc.

FRMS - WELUT DATA SURVEY FORM 851 S 1977

(PLEASE FILL OUT A SEPARATE FORM FOR EACH DATA VARIABLE)

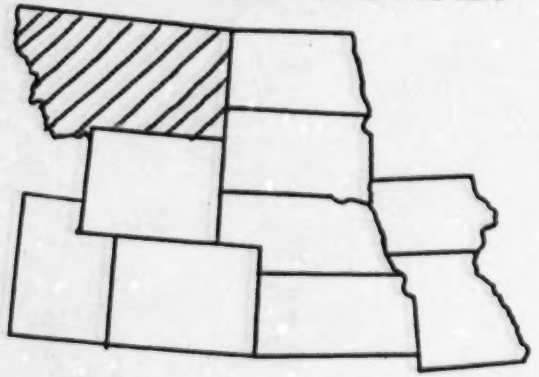
(PLEASE COMPLETE PAGE 1 FOR ALL SPATIALLY REFERENCED DATA)

1) VARIABLE NAME (SEE APPENDIX A) General Soils

2) YOUR AGENCY NAME Montana Agricultural Experiment Station

GEOGRAPHICAL REFERENCE & COVERAGE

1) PLEASE INDICATE ON THE MAP BELOW THE APPROXIMATE BOUNDARIES OF THE AREA OF COVERAGE.



IF DATA COVERAGE IS FOR MONTANA AND/OR WYOMING, PLEASE GIVE EITHER THE U.S.G.S. 1:250,000 SCALE MAP NAMES OR OUTLINE THE AREA OF COVERAGE ON THE ATTACHED INDEX MAPS.

All of Montana

SOURCE DOCUMENT CHARACTERISTICS

1) SOURCE MEDIUM (CHECK ONE)

MAPPED [X] DIGITAL IMAGERY [ ] AIR PHOTO (COLOR INFRA RED) [ ]

TABULAR [ ] AIR PHOTO (COLOR) [ ] AIR PHOTO (BLACK & WHITE) [ ]

OTHER [ ] SPECIFY _____

2) SCALE OF SOURCE?

1:24,000 [ ] 1:62,500 [ ] 1:250,000 [ ]

1:500,000 [X] 1:100,000 [ ] OTHER [X]

SPECIFY SCALE 1:1,000,000

3) LEVEL OF DETAIL OF SOURCE DOCUMENT? (MINIMUM GEOGRAPHIC AREA: 1 ACRE, 1 SQ. MI., ETC. (SEE APPENDIX B) approx. 2,000 acres

4) AGENCY THAT GENERATED SOURCE DOCUMENT? MAES with cooperation from Soil Conservation Service and Forest Service.

5) DATE WHEN SOURCE WAS GENERATED?

MO. [5] YR. 19[7][7]

6) IF MAP OR AERIAL PHOTO WHAT GEOGRAPHIC REFERENCE MARKS OR CONTROL POINTS ARE ON DOCUMENT.

UNIVERSAL TRANS MERCATOR [ ] PUBLIC LAND SURVEY (SECTION CORNERS) [ ]

LATITUDE LONGITUDE (DEGREES, MINUTES, SEC.) [X]

STATE PLANE CO-ORDINATES (FEET) [ ] OTHER [ ] SPECIFY _____

7) IF SOURCE IS AERIAL PHOTOGRAPHY, WHAT TYPE OF RECTIFICATION HAS BEEN DONE TO PHOTOS?

STRIP RATIOING [ ] TIP AND TILT RECTIFICATION [ ]

OTHER (SPECIFY) [ ] NO RECTIFICATION [ ]

SPECIFY _____ UNKNOWN [ ]

8) IS THIS DATA VARIABLE CONFIDENTIAL OR FOR RESTRICTED USE? YES [ ]

COMMENTS _____ No [X]

PLEASE RETURN THIS INVENTORY SHEET TO:

LARRY J. SALMEN
INFORMATION SYSTEMS COORDINATOR
FEDERATION OF ROCKY MOUNTAIN STATES, INC.
SUITE 142, ONE DRAKE PARK
355 W. DRAKE ROAD
FT. COLLINS, COLORADO 80521

Federation of
Rocky Mountain States, Inc.

Figure 2.5
Page from data log book

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## AUTOMATED DATA CHARACTERISTICS
(PLEASE COMPLETE THIS SECTION FOR AUTOMATED DATA ONLY)

1) WHEN WAS THE ENCODING OF THE SOURCE DOCUMENTS BEGUN AND WHEN WAS IT COMPLETED?

BEGAN: MO. 5 19 YR. 77 — not COMPLETED: MO. ___ 19 YR. ___

2) HOW OFTEN IS DATA UPDATED?

- MONTHLY [ ]
- SEMI-ANNUALLY [ ]
- ANNUALLY [ ]
- 5 YEARS [ ]
- NEVER [ ]
- OTHER [X] SPECIFY: as often as new long term data is published

3) WHAT ACCURACY IS THE ENCODED DATA? (SEE APPENDIX C)

A) ESTIMATED BOUNDARY ERROR: between cell boundary approx 8,000' & line on map (FEET)

B) ESTIMATED PURITY ERROR: high in mountainous areas (PERCENT)

C) IF POINT DATA, AVERAGE SAMPLING DENSITY: _____ (POINTS PER SQ MILE)

D) IF LINE/ARC, MINIMUM LINE LENGTH: _____ (FEET)

E) IF CELL OR POLYGON, MINIMUM SIZE: 8½ mi.$^2$ (ACRES)

4) PRIMARY STORAGE MODE IN AUTOMATED FORM

- POINT [ ]
- LINE [ ]
- POLYGON [ ]
- CELL [X]
- 3D (VOLUME) [ ]
- TABULAR [ ]
- OTHER [ ] SPECIFY: _____

5) AGENCY OR BRANCH CURRENTLY RESPONSIBLE FOR AUTOMATED DATA MAINTENANCE?

MAES

## DATA STORAGE STRUCTURE
(PLEASE COMPLETE THIS SECTION FOR AUTOMATED DATA ONLY)

1) STORAGE MEDIUM

CARDS [X] TAPE [X] DISK [ ] MICROFILM OR FICHE [ ] OTHER [ ]

2) VOLUME OF DATA (NO. OF ENTITIES BY STORAGE MODE - SEE APPENDIX D)

# OF CARDS 550 # OF RECORDS ___ # OF CELLS approx. 17,000

# OF CHARACTERS ___ # OF POLYGONS ___ OTHER SPECIFY ___

3) FREQUENCY OF USE OF THIS VARIABLE

DAILY [ ] WEEKLY [ ] UNKNOWN [X] System operational 9/77

MONTHLY [ ] ANNUALLY [ ]

## ACQUISITION NOTES
(PLEASE COMPLETE THIS SECTION FOR ALL DATA)

CONTACT PERSON

YOUR NAME Paul Kesge

YOUR TITLE Extension Soil Scientist

YOUR ORGANIZATION MAES, Bozeman, MT

YOUR TELEPHONE ___

OTHER COMMENTS IF DESIRED: ___

### 2.4.3 MIS Computer Reports

A third and final users information guide is a computer printout. The one drawback with computer printouts is that the user must have access to computer facilities or be prepared for slow turn around time due to operational and mail lag. The computer printouts add another dimension for the user because they enable the user to be more specific in defining his needs. Computer reports is the terminology used when referring to the products the user will receive when the MIS system is used or instructed to search through textual data for key words that may be overlooked or not included in the card file or the data log book.

Searching for key words can be done on any one or combination of information levels. The seven information levels are:

| LEVEL | CONTENT |
|---|---|
| 1 | Number |
| 2 | Subject |
| 3 | Area |
| 4 | Title |
| 5 | Log book page |
| 6 | Source |
| 7 | Physical location |

Figure 2.6 is an example of a computer print-out based on a computer search for topographic data in the Hardin U.S.G.S. 1:250,000 quadrangle area, Montana.

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```
ASI  23
TO 1967
   SUBJECT   TOPOGRAPHY
   AREA   USGS 7.5 MINUTE QUAD PINE BUTTE SCHOOL
   TITLE   TOPOGRAPHY, SCALE = 1 24,000
   LOG BOOK PAGE   T035 T036
   SOURCE   USGS
   PHYSICAL LOCATION   GRAPHIC RECORDS FILE,
                       FRMS, FT. COLLINS, COLO.

ASI  23
TO 1967 = 2
   SUBJECT   TOPOGRAPHY
   AREA   USGS 7.5 MINUTE QUAD SPRING GULCH, MT.
   TITLE   TOPOGRAPHY, SCALE = 1 24,000
   LOG BOOK PAGE   T037 T03.
   SOURCE   USGS
   PHYSICAL LOCATION   GRAPHIC RECORDS FILE,
                       FRMS, FT. COLLINS, COLO.

ASI  23
TO 1967 = 3
   SUBJECT   TOPOGRAPHY
   AREA   USGS 7.5 MINUTE QUAD TONGUE RIVER DAM,
          MONTANA
   TITLE   TOPOGRAPHY, SCALE = 1 24,000
   LOG BOOK PAGE   T039 T040
   SOURCE   USGS
   PHYSICAL LOCATION   GRAPHIC RECORDS FILE,
                       FRMS, FT. COLLINS, COLO.

ASI  23
TO 1967 = 4
   SUBJECT   TOPOGRAPHY
   AREA   USGS 7.5 MINUTE QUAD PEARL SCHOOL, MONT
   TITLE   TOPOGRAPHY, SCALE = 1 24,000
   LOG BOOK PAGE   T041 T042
   SOURCE   USGS
   PHYSICAL LOCATION   GRAPHIC RECORDS FILE,
                       FRMS, FT. COLLINS, COLO.

ASI  23
TO 1967 = 5
   SUBJECT   TOPOGRAPHY
   USGS 7.5 MINUTE QUAD LACEY GULCH, MONTANA
   TITLE   TOPOGRAPHY, SCALE = 1 24,000
   LOG BOOK PAGE   T043 T044
   SOURCE   USGS
   PHYSICAL LOCATION   GRAPHIC RECORDS FILE,
                       FRMS, FT. COLLINS, COLO.

ASI  23
TO 1967 = 6
   SUBJECT   TOPOGRAPHY
   AREA   USGS 7.5 MINUTE QUAD HOLMES RANCH, MT.
   TITLE   TOPOGRAPHY, SCALE = 1 24,000
   LOG BOOK PAGE   T045 T046
   SOURCE   USGS
   PHYSICAL LOCATION   GRAPHIC RECORDS FILE,
                       FRMS, FT. COLLINS, COLO.
```

Figure 2.6 Computer Search for Topographic Data in Hardin USGS 1:250,000 Quad Area, MT

## 3.0 USING MIS TO EVALUATE DATA BASES

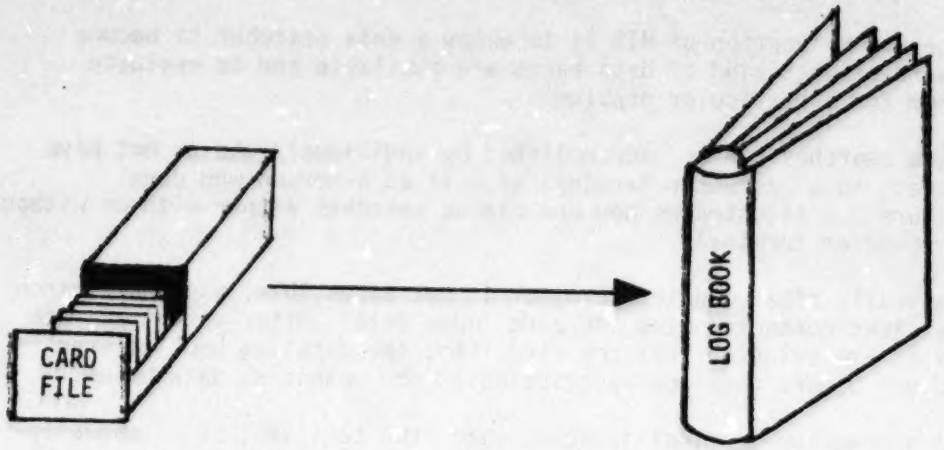
The major function of MIS is to allow a data searcher to become aware of what kind of data bases are available and to evaluate them for a particular problem.

Data searches can be accomplished by individuals who do not have access to a computer terminal as well as a person who does. Figure 3.1 illustrates how one can do searches either with or without a computer terminal.

Basically if a computer terminal is not accessible, a manual search is first conducted with the card index file. After potential data bases are selected from the card file, the data log book is used to get a more detailed description of the potential data bases.

If a computer terminal is accessible, the tedious task of manually searching through the card file can be eliminated. The basic commands for doing computer searches are listed in Appendix A of this report. After potential data bases are selected from the listing, the log book is once again used to obtain a more detailed description of the potential data bases.

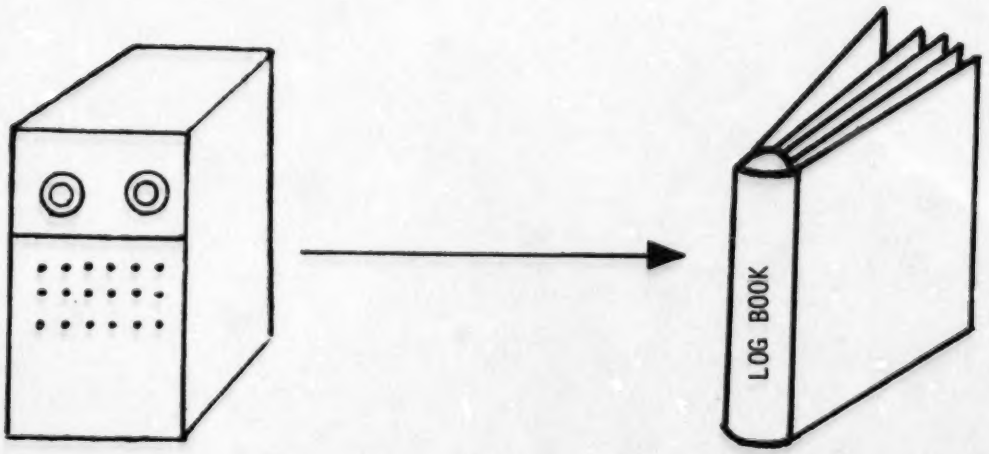
DATA SEARCH WITHOUT A COMPUTER TERMINAL




DATA INDEXING CARD FILE

DATA CHARACTERISTICS
LOG BOOK

DATA SEARCH WITH A COMPUTER TERMINAL




COMPUTER SEARCH

DATA CHARACTERISTICS
LOG BOOK

Figure 3.1 Using MIS for data base evaluation

## 4.0 WHERE TO SEARCH IF DATA IS NOT IN MIS

It is obvious that during the initial development stages of MIS all relevant data bases will not be identified in MIS. The information in MIS will hopefully keep growing as time goes on.

If one decides that the data needed for a particular problem is not in MIS the data searcher will have to look to outside sources for the data. Searching for relevant data should always begin with a complete survey of the data that already exists in FWS files to avoid unnecessary expenditures of time, effort, and money. Only after a complete analysis of existing files has been conducted should one consult outside sources.

As indicated in interviews and workshops held by FRMS, many FWS personnel simply are unaware of many data sources. If this obstacle is cleared, the task of data acquisition can be greatly simplified. Lists of potential suppliers of data are useful as a key to sources of general categories of information. The partial listing of potential data suppliers on the following two tables (Tables 4.1 and 4.2) contain an overview of data sources in Montana and Wyoming. This list was prepared for the Fish and Wildlife Service, Billings Area Office. As MIS becomes used by other Area Offices within Region 6, similar tables of potential data sources for these Area Offices should be compiled. Report 2.3 "Survey of Alternative Geographic Data Bases Covering Montana and Wyoming for the U.S. Fish and Wildlife Service Geographic Information System" is an example of the kind of information that should be recorded concerning potential data sources. After a detailed description is obtained of data bases from sources, the information should be recorded in MIS for future data searchers.

## 5.0 SUMMARY

Parallel to the development of a geographic information system (GIS) is the collecting of data bases that will be used by the GIS. A data library system should therefore be proposed during the initial development stages of any GIS. The map indexing system (MIS) described if this users manual is such a system. By using MIS, FWS can catalogue and file spatially related data in a comprehensible, partially manual, partially automated library system.

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Table 4.1 DATA AVAILABLE FOR MONTANA
(X denotes potential source of data)

| | SCS | FS | BR | Bonneville Power Admin. | Pacific Northwest River Basins Comm. | MT. Dept. of Natural Resources & Conservation | MT. Dept. of Highways | MT. Ag. Experiment Station | MT. Dept. of Community Affairs | NPS | Dept. of Defense, Def. Mapping Agency | USGS | BLM | MT. Bureau of Mines & Geology | MT. Dept. of State Lands | Nat'l Weather Service | MT. Dept. of Health & Environmental Sciences | ASCS | Army Corps of Engineers | U.S. Dept. of Commerce, Census Bureau | FWS | MT. State Game & Fish Dept. | Environmental Protection Agency | Bureau of Mines | Northern Great Plains Resource Program |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soils | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | X |
| Geology | X | X | X | X | | X | X | | | | | | | X | | | | | X | | | | | | X |
| Climate | X | | | X | X | | | | | | | | | | | X | | | | | | | | | X |
| Ownership | | | | | | | | | | | | | X | | | | | | | | | | | | X |
| Vegetation | X | X | | X | | X | | | X | | | | X | | X | | | | | | | | | | X |
| Land Use | X | | | | | | | | | | | | | | | | X | | | | | | | | |
| Topography | | X | X | | X | | | | | X | X | X | X | X | | | | | | | | | | | |
| Socio-Econ. Data | | | | | | | | | X | | | | | | | | | | X | | | | | | |
| Wildlife | X | X | | X | X | | | | | | | | X | | | | | | | X | X | | | | |
| Water Resources | X | X | | X | | X | | | | | | X | | | | | | | X | | | X | | | |
| Mineral Industry Data | | | | | | | | | | | | X | | | | | | | | | | | X | | X |
| Land Mgt. Plans | | X | | | | | | | | X | | X | | | | | | | | | | | | | |

Table 4.2 DATA AVAILABLE FOR WYOMING

(X denotes potential source of data)

| | Soils | Geology | Climate | Ownership | Vegetation | Land Use | Topography | Socio-Econ. Data | Wildlife | Water Resources | Mineral Industry Data | Land Mgt. Plans |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCS | X | X | X | | X | X | | | X | X | | |
| FS | X | X | | | X | | X | | X | X | | X |
| BR | X | X | | | X | | X | | | | | |
| Bonneville Power Administration | X | X | X | | | | | | X | X | | |
| Pacific Northwest River Basins Comm. | X | X | X | | | | X | | X | X | | |
| WY State Extension Service | X | | | | | | | | | | | |
| NPS | | | | | | | X | | | | | X |
| Dept. of Defense, Dept. Mapping Agency | | | | | | | X | | | X | | |
| USGS | | X | | | | | X | | | | X | |
| BLM | | | | X | X | | X | | X | | X | X |
| Dept. of Geology, Univ. of Wyoming | | | | | X | X | | | | | | |
| WY Environmental Quality Dept. | | | X | | X | | | | | X | | |
| Nat'l Weather Service | | | X | | | | | | | | | |
| ASCS | | | | | | X | | | | | | |
| Army Corps of Engineers | | X | | | | | | | | X | | |
| WY State Geol. Survey | | X | | | | | | | | | X | |
| US Dept. of Commerce, Census Bureau | | | | | | | | X | | | | |
| FWS | | | | | | | | | X | | | |
| WY State Game & Fish Dept. | | | | | | | | | X | | | |
| Environmental Protection Agency | | | | | | | | | | X | | |
| Univ. of WY Water Resource Research Inst. | | | | | | | | | | X | | |
| Bureau of Mines | | | | | | | | | | | X | |
| Northern Great Plains Resource Program | X | X | X | X | X | | | X | | | X | |

# APPENDIX A

## EXAMPLES OF COMMANDS FOR DATA BASE SEARCHING WITH A COMPUTER TERMINAL

1. Example of search for black-footed ferret data.

2. Example of search for soils data in Wyoming.

3. Example of search for vegetation data in Wyoming for the last two years.

COMMANDS FOR MIS SEARCHING

1. Example of search for black footed ferret data

| DESCRIPTION OF USER COMMANDS | USER COMMANDS | COMPUTER OUTPUT |
|---|---|---|
| 1 user identification code | WELUT,FRMS | USER NUMBER: |
| 2 commands for getting into MIS | ROUT,6<br>-MIS | TERMINAL: 12,TTY<br>RECOVER/SYSTEM:<br>READY |
| 3 tells MIS where to find the file containing data base description | *MASTER=1. | ENTER MAIN OVERLAY OF THE TRIAL SYSTEM<br>GOOD LUCK<br>?<br>THE MASTER FILE IS ONE UNIT 1.<br>? |
| 4 initiates the SEARCH function within MIS | *SEARCH | CONTROL CARD NOW BEING PROCESSED...<br>*SEARCH<br>? |
| 5 user wants levels 1,2,3,4,5,6,7 printed out for each data | *CONTINUOUS 1,2,3,4,5,6,7. | *CONTINUOUS 1,2,3,4,5,6,7.<br>? |
| 6 title of search | SEARCH FOR FERRET DATA. | SEARCH FOR FERRET DATA.<br>? |
| 7 user wants levels 2,3,4 for each data record searched | 2,3,4. | 2,3,4.<br>? |
| 8 command which tells MIS that FERRET is the key word to be searched | (FERRET=100)$ | (FERRET=100)$<br>? |
| 9 ends the search | *END | (computer lists all data bases) |
| 10 terminates MIS and logs off the computer | STOP<br>BYE | ?<br>/ |

2. Example of search for soils data in Wyoming

| DESCRIPTION OF USER COMMANDS | USER COMMANDS | COMPUTER OUTPUT |
|---|---|---|
| 1 user identification code | WELUT,FRMS | USER NUMBER: |
| 2 commands for getting into MIS | ROUT,6<br>-MIS | TERMINAL: 12,TTY<br>RECOVER/SYSTEM:<br>READY |
| 3 tells MIS where to find the file containing data base description | *MASTER=I. | ENTER MAIN OVERLAY OF THE TRIAL SYSTEM<br>GOOD LUCK<br>?<br>THE MASTER FILE IS ON UNIT 1.<br>? |
| 4 initiates the SEARCH function within MIS | *SEARCH | |
| 5 user wants levels 1,2,3,4,5,6,7 printed out for each data | *CONTINUOUS 1,2,3,4,5,6,7. | CONTROL CARD NOW BEING PROCESSED...<br>*SEARCH<br>?<br>*CONTINUOUS 1,2,3,4,5,6,7.<br>? |
| 6 title of search | SEARCH FOR SOILS IN WYOMING, | SEARCH FOR SOILS IN WYOMING,<br>? |
| 7 user wants levels 1,2 for each data record searched | 1,2. | 1,2<br>? |
| 8 command which tells MIS that SOILS and 894 are the key words to be searched. | (SOILS.AND.894=100)$ | (SOILS.AND.894=100)$<br>? |
| 9 ends the search | *END | (computer lists all data bases)<br>? |
| 10 terminates MIS and logs off the computer | STOP<br>BYE | / |

3. Example of search for vegetation data in Wyoming for the last two years

| DESCRIPTION OF USER COMMANDS | USER COMMANDS | COMPUTER OUTPUT |
|---|---|---|
| 1 user identification code | HELUT,FIMS | USER NUMBER: |
| 2 commands for getting into MIS | ROUT,6<br>-MIS | TERMINAL: 12,TTY<br>RECOVER/SYSTEM:<br>READY |
| 3 tells MIS where to find the file containing data base description | *MASTER=1. | ENTER MAIN OVERLAY OF THE TRIAL SYSTEM<br>GOOD LUCK<br>? |
| 4 initiates the SEARCH function within MIS | *SEARCH | THE MASTER FILE IS ON UNIT 1.<br>? |
| 5 user wants levels 1,2,3,4,5,6,7 printed out for each data (see page 11) | *CONTINUOUS 1,2,3,4,5,6,7. | CONTROL CARD NOW BEING PROCESSED...<br>*SEARCH<br>? |
| 6 title of search | SEARCH FOR VEG IN WYOMING, | *CONTINUOUS 1,2,3,4,5,6,7.<br>? |
| 7 user wants level 1, for each data record searched | 1, | SEARCH FOR VEG IN WYOMING,<br>?<br>1,<br>? |
| 8 command which tells MIS the key words to be searched | (894.AND.V.AND.1977.OR.894.AND.V.AND.1976=100)$ | (894.AND.V.AND.1977.OR.894.AND.V.AND.1976=100)$<br>? |
| 9 ends the search | *END | (computer lists all data bases)<br>? |
| 10 terminates MIS and logs off the computer | STOP<br>BYE | /<br> |